

OCEAN GALES AND STORMS, JANUARY 1938—Continued

Vessel	Voyage		Position at time of lowest barometer		Gale began January—	Time of lowest barometer January—	Gale ended January—	Lowest barometer	Direction of wind when gale began	Direction and force of wind at time of lowest barometer	Direction of wind when gale ended	Direction and highest force of wind	Shifts of wind near time of lowest barometer
	From—	To—	Latitude	Longitude									
NORTH PACIFIC OCEAN—Continued													
Minnesotan, Am. S. S.	Los Angeles	Balboa	30 12 N.	116 42 W.	20	4 p, 20	20	Inches 29.93	WNW	WNW, 8	WNW	WNW, 8	None.
Pres. McKinley, Am. S. S.	Victoria, B. C.	Yokohama	51 39 N.	143 03 W.	19	6 a, 20	22	28.51	S	W, 10	W	W, 10	SW-W.
Amagisan Maru, Jap. M. S.	Yokohama	Los Angeles	43 25 N.	167 13 W.	21	Noon, 22	23	29.60	ESE	NE, 6	NNW	N, 8	N-NE.
Tatsuno Maru, Jap. S. S.	do	do	37 05 N.	160 18 E.	24	6 p, 24	25	29.63	NW	NW, 6	WNW	NW, 8	SE-W-NW.
Empress of Canada, Br. S. S.	Victoria, B. C.	Honolulu	38 58 N.	139 59 W.	24	7 a, 25	25	29.61	SE	W, 6	NNW	NNW, 9	
West Cactus, Am. S. S.	Champerico	Los Angeles	15 06 N.	93 31 W.	25	6 a, 25	26	29.89	NNE	NNE, 5	NE	N, 9	NNE-N.
Vermont, Am. S. S.	Balboa	San Diego	15 00 N.	94 00 W.	25	2 a, 25	25	29.85	NNW	NNW, 6	E	NNE, 10	N-NNW-NNE.
Minnesotan, Am. S. S.	Los Angeles	Balboa	15 00 N.	96 34 W.	25	6 p, 25	26	29.87	E	NE, 9	NNE	NNE, 11	E-NNE.
Coloradan, Am. S. S.	do	do	11 20 N.	89 00 W.	25	4 p, 26	26	29.84	ENE	NE, 6	NE	NE, 7	None.
Pres. McKinley, Am. S. S.	Victoria, B. C.	Yokohama	50 20 N.	173 05 E.	24	10 a, 26	27	28.54	SE	SW, 7	WSW	WNW, 12	SSE-W.
Golden Sun, Am. S. S.	Iloilo, P. I.	San Francisco	38 00 N.	164 35 E.	26	11 p, 26	26	29.30	SSW	SSW, 7	W	SW, 9	SSW-W.
San Pedro Maru, Jap. M. S.	Yokohama	do	38 10 N.	156 15 E.	26	2 a, 27	27	29.17	SW	SSW, 11	W	SSW, 11	S-W.
W. S. Miller, Am. S. S.	Vladivostok	do	40 48 N.	166 06 E.	26	2 p, 27	27	29.32	S	S, 10	NW	S, 10	S-NW.
Pres. McKinley, Am. S. S.	Victoria, B. C.	Yokohama	49 07 N.	171 47 E.	27	8 p, 27	28	29.16	SSE	SSE, 10	SW	SSE, 11	S-SW.
Djambi, Du. M. S.	Manila	Los Angeles	32 50 N.	162 20 W.	26	3 p, 29	30	30.14	NNE	E, 9	E	NE, 11	ENE-E.
Pres. Jackson, Am. S. S.	Yokohama	Victoria, B. C.	48 50 N.	177 00 E.	27	4 a, 28	28	29.50	S	S, 11	S	S, 11	
Missourian, Am. M. S.	Balboa	Los Angeles	10 40 N.	87 10 W.	29	4 p, 29	29	29.88	NNE	E, 5	E	NE, 7	NE-E.
Matsonia, Am. S. S.	San Francisco	Honolulu	35 30 N.	129 25 W.	30	1 p, 30	30	29.49	S	S, 8	WSW	SW, 8	S-WSW.
Pres. McKinley, Am. S. S.	Victoria, B. C.	Yokohama	40 52 N.	146 23 E.	31	2 p, 31	31	29.52	SE	ENE, 7	NE	E, 8	E-NE.
Missourian, Am. M. S.	Balboa	Los Angeles	15 48 N.	94 55 W.	31	2 p, 31	31	29.91	N	NNE, 8	NE	NNE, 9	NNW-NNE.

* Position approximate.

NORTH PACIFIC OCEAN, JANUARY 1938

By WILLIS E. HURD

Atmospheric pressure.—Numerous lows crossed the northern waters of the ocean during January. Many, as in the preceding month, were of great depth, and on more than half the days of the month the barometer read below 29 inches on some part of the North Pacific. The lowest pressure of the month, 28.02, was read at Dutch Harbor on January 14. The Aleutian cyclone, with average central pressure about 29.60 inches, lay over the region extending from the western part of the Gulf of Alaska well across the chain of the Aleutians. The average pressures there varied little from the normal, but there was a strong plus departure to the northward, as shown by St. Paul, +0.12.

In middle latitudes, the region of the usual oceanic high was invaded by extensive cyclonic areas during the early half of the month. In consequence, on the average for the month, there was only a comparatively narrow anticyclonic belt extending largely between latitudes 20° and 30° N., with wider centers of higher pressure lying off the California and east China coasts, with pressure some 0.10 inch above the normal over the Nansei and Ogasawara Islands.

TABLE 1.—Averages, departures, and extremes of atmospheric pressure at sea level, North Pacific Ocean, January 1938, at selected stations

Stations	Average pressure	Departure from normal	High—	Date	Lowest	Date
	Inches	Inch	Inches		Inches	
Point Barrow	29.98	-0.10	30.64	11, 27	29.26	17
Dutch Harbor	29.58	.00	30.74	31	28.02	14
St. Paul	29.75	+ .12	30.84	31	28.66	14
Kodiak	29.53	-.06	30.48	30	29.34	15
Juneau	29.80	-.08	30.47	28	28.69	20
Tatoosh Island	30.06	+ .08	30.66	24	29.30	31
San Juan	30.12	+ .01	30.54	25	29.57	31
Mazatlan	29.94	-.01	30.04	23	29.86	6, 12
Honolulu	30.00	.00	30.19	17	29.77	28
Midway Island	30.01	-.02	30.36	23, 26	29.62	31
Guam	29.86	-.04	29.92	{ 11, 13, 18, 22, 23, 25 }	29.73	3
Manila	29.90	+ .01	29.97	9	29.80	11
Hong Kong	30.13	+ .02	30.35	8	29.83	30
Naha	30.17	+ .09	30.36	9, 10	29.86	29
Titijima	30.12	+ .11	30.30	10, 17, 18	29.87	2

NOTE.—Data based on 1 daily observation only, except those for Juneau, Tatoosh Island, San Francisco, and Honolulu, which are based on 2 observations. Departures are computed from best available normals related to time of observation.

Extratropical cyclones and gales.—January 1938 was a stormy month on the North Pacific, with gales of practically daily occurrence on some part of the ocean, and winds of the higher forces, 11 to 12, reported on the 3d, 5th, 9th, 10th, and 26th to 28th in middle and high latitudes, to the westward of the 165th meridian of west longitude.

During the 2d to 5th of the month widely scattered gales were encountered between about 140° W. and the coast of Japan. The principal storm area of the period, however, lay to the westward of the 180th meridian, with reported gales occurring between latitudes 30° and 45° N. On the 2d the center of a cyclone of some magnitude lay east of the island of Hokushu, whence it moved east-northeastward, and on the 6th crossed the central Aleutians. The heaviest winds reported in connection with the storm occurred far south of the center. The Japanese motorship *San Pedro Maru*, near 34° N., 145° E., on the 3d, met a west hurricane while the storm center lay near 45° N., 160° E., and the British motorship *Silverbelle* encountered a like wind near 37° N., 165 E., while the center was close to 46° N., 180°.

On the 7th another storm lay to the immediate east of Japan. It rapidly developed in depth and extent as it moved eastward, but no important gales occurred in connection with it until the 9th when the American steamer *Texas* eastbound toward San Francisco ran into heavy gales which increased to force 12 in the afternoon, near 38° N., 172° E., continuing until the morning of the 10th, lowest barometer 28.72. On the same date also the Dutch motorship *Saparoea*, far to the northeastward near 44° N., 171° W., was also involved in hurricane winds, lowest barometer 28.69. During the 9th and 10th the cyclone area extended over two-thirds or more of the width of the ocean in high latitudes, and caused scattered gales of force 9 to 10 as far to the eastward along the northern routes as about longitude 150° W. Similar conditions prevailed until the 15th, with low pressures and strong to whole gales scattered over a wide area of the upper routes in west longitudes. By the 15th and 16th the gale region had extended well toward the coast of the United States, as indicated by the report of the motorship *Saparoea* which encountered a force-10 wind from southeast on the 15th, near 46° N., 134° W., followed

by lessening gales which were still of force 8 on the 16th close to the Oregon coast. The cyclone center on these dates lay close to the Alaskan Peninsula. From the 17th to 22d it fluctuated over the Gulf of Alaska, with narrowed sphere of influence, although it continued to cause strong westerly gales a day's journey or less out from the Oregon coast on the 18th and 19th. On the 20th, also, Washington coastal winds were strong, with a velocity of 61 miles for a 5-minute period from the south reported at North Head.

On January 25 a rather deep cyclone, central in the Japan Sea, caused strong southwesterly gales in west and east coastal waters of Honshu. The storm center, with great rapidity and increasing intensity, moved northeastward across the Kuril Islands and on the 26th and 27th lay near the east coast of Kamchatka, lowest pressure 28.35, where it merged with another disturbance of the 24th-25th from the western Aleutians. The western part of the northern steamship routes was strongly affected by the major storm, the heavy weather extending as far eastward on the north as the central Aleutians, and on the south, at approximately 35° N., as far east as about 170° E. On the 26th and 27th the Japanese motorship *San Pedro Maru* met southwesterly gales of force 11 near 46° N., 156° E., and the American steamship *President McKinley* had westerly to southwesterly gales of forces 11-12 between 49° and 50° N., longitudes 178° to 172° E., lowest barometer 28.54, on the same dates. In addition, on the 28th, the western Aleutian region continued to be heavily disturbed, with the American steamship *President Jackson* encountering a force-11 gale from the south near 49° N., 177° E.

Late in the month there was some storminess to the northward of the central Hawaiian Islands along the southern border of a high pressure area. The strongest gale of the locality and period reported was of force 11, northeast, barometer 30.14, encountered by the Dutch motorship *Djambi* near 33° N., 162° W., on the 27th.

Tropical disturbances.—During the 12th (local time) a low passed across the central Philippines into the China Sea. No high winds appear to have been directly connected with it, although near the north end of Luzon on the 13th, the Dutch motorship *Djambi* experienced a gale of force 8. An account of this and of an earlier disturbance, by the Rev. Bernard F. Doucette, S. J., Manila Observatory, is subjoined.

On the 11th to 13th there were some evidences of the formation of a tropical low between the Revillagigedo Islands and Lower California. It was indicated largely by the wind circulation and slightly depressed barometer, as no winds of higher force than 6 were observed.

On the 29th a low of tropical origin appeared central in the vicinity of 20° N., 165° W. It moved northwestward and on the 31st was central near Midway Island where the barometer fell to 29.62. During the course of the disturbance up to the close of the month, fresh gales were reported by steamers to the northward of the center.

Tehuantepecers and Chubascos.—Near the close of the month there was pronounced "norther weather" in the Gulf of Tehuantepec. During a passage of the Gulf on the 25th-26th the American steamer *Minnesotan* encountered wind velocities of force 11 from the north-

northeast. On the 31st, in the same locality, there was a gale of force 9. Off the Costa Rican coast northeast Chubascos of force 7 were reported on the 26th and 29th.

Fog.—There was little fog on the North Pacific this month. The only coastal fogs reported by ships were those of the 8th and 27th off southern and Lower California, and of the 31st in the Gulf of Tehuantepec. Along the strip 30° to 50° N., 130° to 140° W., scattered fog was observed on the 3d to 6th and on the 9th. It was observed on one day near 44° N., 179° E.

TYPHOONS AND DEPRESSIONS OVER THE FAR EAST

By BERNARD F. DOUCETTE, S. J.

[Weather Bureau, Manila, P. I.]

Depression, January 6-10, 1938.—During the last few days of December 1937 and the following days in January 1938, there was a persistent low pressure trough extending from southern Mindanao eastward to the Western Caroline Islands, and perhaps farther. At various times, pressure at Yap would fall and the winds would shift as though a depression, even a typhoon, were forming. For a day or so, these conditions would last and then the ordinary normal weather would be reported. Reports from Java and nearby regions indicated the presence of a rather strong, steady southwesterly current of air during these days. It is the opinion of the writer that all the conditions for the formation of a disturbance were present but the region of action was so close to the equator that no sustained development took place.

On January 6 a definite center appeared about 150 miles west of Yap. It moved northwest, then west, and after being stationary 1 day (January 8), it recurved to the northeast and disappeared on the afternoon of January 10.

Typhoon, January 11-13, 1938.—The morning of January 11, there seemed to be another depression center about 300 miles east of Surigao, which moved in a northwesterly direction, intensifying the same afternoon when about 150 miles east of Samar. That evening, the center had moved to a position close to and east of Virac, where it weakened rapidly as its course changed to the west-by-south. It crossed southern Luzon as a depression during the night and was located the next morning (January 12) over Ragay Gulf. From this position, it moved north-northwest and northwest to northern Luzon, now only a weak low pressure area. It had entirely disappeared by the afternoon of January 13. On January 11, at 4 p. m., Virac, Catanduanes Island, reported a pressure of 749.6 mm. (29.512 in.) with west-northwest winds force 6. This was just before the typhoon changed its course to the west-by-south and weakened.

It should be noted that this analysis of the situation is based almost entirely upon synoptic observations made at Guam, Yap, and Palau, combined with observations made over the Philippines. No ships' observations north of the region under consideration have been available. It is possible, but no observations are available for confirmation, that an active typhoon center existed part of the time, without rapid movement in any particular direction, and that the disturbance approaching the Philippines January 11 could be this typhoon in its final stages.